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following organizations: Forest Service, National Park Service, Bureau of Reclamation, U. S. Geological Survey, War Department and State Experiment Stations. This work is otherwise conducted cooperatively with the State Engineers of Wyoming and Colorado, and various municipalities, irrigation associations, power companies and others. Precipitation records are supplied by the U. S. Weather Bureau.

PRECIPITAL ON DATA of Agricultural Engineering of the U. S. Department of Agriculture, in cooperation with State departments, other following organizations: Forest Service, National Park Service, Bureau of Reclamation, U. S. Geological Survey, The following data pertaining to snow surveys and irrigation water-supply forecasts are provided by Bureau Federal bureaus and local organizations. The snow measurements are made principally by field personnel of the

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	Departure	from	Normal	Inches	-0.29	-0.43	-0.55	-0.58	-1.63	-0.58	
	Precipitation		April	Inches	92.0	1/2.0	1.38	\$6°0	1.09	0.95	
	Departure	from	Normal	Inches	0.81	-0.32	+0.51	-1.23	-1.58	60.0+	
	Precipitation	October 1 to	April 30	Inches	7,02	5,48	64.6	6.03	0.4 <u>1</u>	5.91	
		STATE			East. Mont.	Cert. Mont.	North. Wyo.	Wyoming	Colorado	Colorado	
	The state and not	WATERSHED			Missouri	Missouri	Missouri	North Platte	South Platte	Arkansas	

Colorado

same time last year. Warm weather in many localities caused melting with pronounced increase in stream flow. Pre-In Colorado the May first snow surveys indicate a smaller water content of snow on the courses than for this a very few snow courses, elevation 10,000 feet or more, indicated an equal or greater water content than the cipitation for April throughout Colorado, for both mountain and plain areas, was about one-half the normal.

For the South Platte drainage, average for 15 snow courses, the water content of the snow is 8 percent less For the Poudre drainage, 6 snow courses, the average water conthan May 1, 1938. For the headwaters of the Thompson, St. Vrain, Boulder and Clear Creek, the water content is equal to or slightly better than for last year. tent was about 20 percent less than last year. For the Arkansas drainage, the average water content, as measured on 9 snow courses, was 5.9 inches, which is about 25 percent less than it was a year ago. As compared with the four-year average, it is about 3 percent more.

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Precipitation records are supplied by the U. S. Testher Burson.

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Colorado

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low the Pondre drainage, b amon contaes, the average mater com-For the South Finths drainers, average for 15 and courses, the water content of the anow is 8 percent loss then May 1, 1938. For the headwaters of the Thempson, St. Train, Boulder and Clear, the water content equal to or slightly botter than for last years was about 20 percent less than lest years

about 25 persent less than it was a year ege, it compared with the four-year eversge, it is about 3 persent more Nor the Arkenses drainage, the average water content, as messared on 9 and courses, was 5.9 inches, with is

voirs in this area will in all probability be filled to capacity during the early June run-off. The present storage of The principal reser-For the Arkansas Val-Reservoir storage in the South Platte drainage has continued to improve over the past month. water for this season's use is definitely greater than for any period during the past 10 years. ley in Colorado the storage is materially better.

Sub-soil moisture conditions throughout the irrigated areas are reported to be good. Because of deficient rainfall and prevailing winds during the month of April, the top soil has lost much of its moisture. However, crop conditions at this time are generally good.

be less than it was last season. Spring and early summer run-off will be ample to fill completely all reservoirs, Because of the deficiency in precipitation during April, the run-off from the snow storage in the mountain areas from the state for the South Platte but little or none for the Arkansas. The later irrigation supply from the snow at and in addition will furnish an adequate supply for direct irrigation until July first. There will be some out flow high elevation will be below normal.

Wyoming

a very few of these recent surveys show an increase in water content over that of April 1, and in some cases the course May I snow surveys in Wyoming indicate definitely less water in the snow cover than at this time last year. Only area was reported bare of snow. For the watershed of the North Platte in Wyoming, ten snow courses show on the average for May 1, a water content average water content of 9.9 inches, while a year ago it was 13.3 inches. By this comparison, there is about 25 percent less water in snow storage on this drainage area than for May 1 of last year, and about 16 percent less than the less than the four-year average for these same snow courses. For the Laramie River drainage, seven courses show an of 17.4 inches as against 20.6 inches a year ago, or a less amount of about 15 percent. This figure is 13 percent

The Bighorn drainage area shows a marked decrease in the water content of snow, May 1, as compared with that of last year. Eight courses on the average show only 3 inches while last year the average was 5.8 inches, or a reduction of nearly 50 percent. This May 1 average is only 44 percent of the four-year mean. The conditions for the Shoshone and Powder River drainage areas are similarly deficient in water content of the snow cover. Precipitation over the North Platte River drainage for April was below normal. The soil moisture conditions generally over the state are not good, and because of the unusually high temperatures in April, the top soil has dried out retarding the growth of range grass and small grain in the dry-farming areas. In the irrigated areas, water is being applied to the crops. In the Powell district soil moisture conditions are reported to be good.

To ease the area will in all probability be filled to deposity during the past 10 years. For the Arieness Tel-Reservoir storage in the South Platte draineg has continued to improve over the past month. The principal reservley in Coldrago the storage is merentally pattory

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a very few a surveys to Whoning indicate definitely less mater to that of this of this this time case the course wors to erad bedracer age

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The Biging dreining area shows a marked decrease in the water content of anow, May I, as compared with that of Sicus commuse on the exercise show only 3 judges will four the everage are 2.8 judges or a regimepersont. This May I everyge is only the persons of the four-year mean. The conditions for the Sacrons one Porder Alver dreiness are similarly deficite in maker cortent of the anow covers Took years

Procipitation over the North Platte Biver drainage for April was below normal. The soil motature conditions comending over the growth of renge grees and because of the unusually high temperatures in April, the temperature of the drivers water is estre apolica to the crops. In the fowell district soll moisture conditions are reported to be goods

Reservoir storage in the North Platte Valley is about one-third more on Ment 1 than it was a year ago, and for the Wheatland Reservoir, on the Laramie River drainage, it is double that of last year.

water will be used, it appears at this time that there will be an ample supply of irrigation water this season for The run-off in the North Platte from snow storage will be approximately three-quarters that of last year, and from the Laramie River the run-off is not expected to exceed two-thirds. For the irrigated areas, where stored the districts in both Wyoming and Nebraska.

Montana

four-year average; five courses on the Jefferson show only 2 percent less than a year ago and 25 percent less than than a year ago. The average of six courses on the Gallatin is but 40 percent of last year and 35 percent of the Over the Missouri drainage area in Montana, the May I snow surveys show definitely a smaller water content the four-year average; while for the Missouri seven courses have an average of 30 percent less, which is also percent less than the four-year mean. From these comparisons, it is expected that the run-off from the snow storage will not be more than about two-thirds of that of last year. The April precipitation over the Missouri drainage in Montana was about 70 percent of normal, and from October 1, 1938, to May 1 of this year, the accumulated rainfall has been deficient.

Reservoir storage in the Lemmie Siver drainage, it is downe that of that it was a year ago, and for

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MISSOURI AND ARKANSAS RIVERS

Bureau of Agricultural Engineering, U. S. Dept. Agr.; Forest Service; Colo. Agri. Expt. Station Summary of Federal and State Cooperative Snow Surveys

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1939. Colo. Expt.	Location	Locality			6mi.N.Spencer	15mi.NE. Sula	Smi.N.Poloris	Gibbons Pass Smi. S. Gibbons P	0 T			Hebgen Dam Zmi.S.Lewis L.				14mi. S. Bozeman	H	12mi.S.Gallatin			11mi.SW.Helena 17mi.SW.Helena			W Gilman		Summit
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Issued May	Local	Drainage			Red Rock Cr.	Rock Cr.	Wise River	W. E. Big. Hole Idano	Pipestone Cr. Mont Seymour Cr. Mont		Firehole R.		Greyling Cr.		Cr.	Hyalite Cr.		Bozeman Cr. Gallatin R.		(8)	Ten Mile	==	Canyon Cr.	South Fork		Iwo Medicine
	Main Drainage)	No Snow Course	JEFFERSON RIVER	Camp Creek*	East Fork R.S.*	rs.		Pipestone Pass Storm Loke*	MADISON RIVER	Aster Creek*	Hebgen Dam Lewis L. Divide	Twenty-One Mile*	GALLATIN RIVER	Devil's Slide	Hood Meadow Extn	Mystic Lake No.1	Mystic Lake No.2 Twenty-One Mile	MISSOURI RIVER	(Helena-Great Falls)	Chessman Reservr. Tenmile Cr.Lower	Tenmile	Stemple King's	Goat Mountain	MARIAS RIVER	18 Marias Pass
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MISSOURI AND ARKANSAS RIVERS

Summary of Federal and State Cooperative Snow Surveys

Bureau of Agricultural Engineering, U. S. Dept. Agri. Forest Service; Colo. Agri. Expt. Station

Issued May 10, 1939. Colo. Expt. Station, Fort Collins, Colo.

	Main Drainage	Local		Location		Elev. National	May 1	Snow	Course M	Measurements	ents
	and	Drainage	State	Locality	Descrip-	Forest	Av. S	now De	Snow Depth Av. Water	- 1	Content
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222	Brooks Lake No. 2* Up.Hardpan Basin Sylvan Pass	Shoshone R. Hardpan Cr. Middle Cr.	Wyo.	Brooks Lake 27mi•SM•Cody Sylvan Pass		9200 Washakie 9500 Shoshone 7100 Yel.Nat.P.	1000 1000 1000	1000 to 1000 t	-	1000 -	100 m
	BIGHORN RIVER				Werdse 101	- drillage e			70.00		2
19	Brooks Lake No.2	Wind River	=		23-44N-110W	9200 Washakie		50.6			16.3
1910	Ranger Creek	Ranger Cr.	==	14mi.E. Shell 16mi.SW.Lander	32-531-85T	8800 Bighorn 10200 Washakie	17.52	19.91	13.9	N 00	40
H	-	Shell Creek	==		19-53M-88W			000			0.0
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17	Big Goose Cr.R.S. E.Goose Cr.	E.Goose Cr.	=	20mi.SW. Sheridan	4-53N-86W	7700 Bighorn	2.6	0.0	6.0 1.0	0	0.2
	POTDER RIVER				1 1				-		
RH.	Red Fork Sour Dough	Middle Fk. Sour Dough Cr.	==	25mi.W.Kaycee 10mi.W.Klondike	18-43N-85T	7500 Off Forest 8500 Bighorn	11.3	1 1	4.00 7.4	200	010
	NO. PLATIE RIVER				Average for	Drainage			t. t t.		ا ا
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MISSOURI AND ARKANSAS

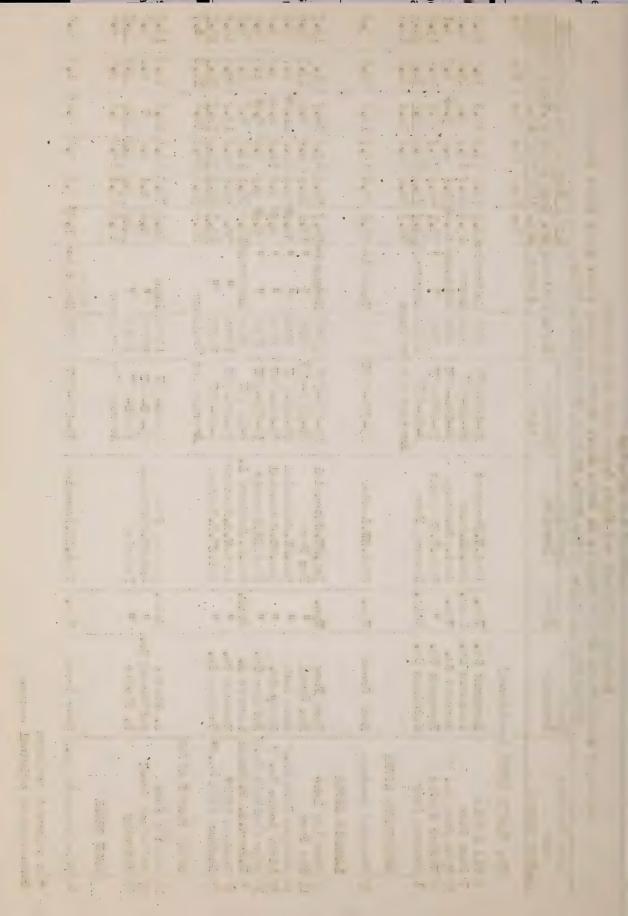
Summany of Pederal and State Cooperative Snow Surveys

Bureau of Agricultural Engire ring, L. S. Dept. Agr.; Forest Service; Colo. Agri. Empt. Station

Issued Tay C. 1937. Colo. Expt. Station, Fort Colling, Colo.

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6	9 Old Battle	Enemomnt Cr.	W.vo.	12mi.W.Encupunt	29-14N-85W	9800 MedicineB	Jul 2. 2 78	.0.73.3	3 35.3	32.5	35.0
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-	Cameron Pass	Michigan Cr.	Colo.	Cameron Pass		10300 Roosevel 454.7 75.2 64.0 2	464.7 75	2 64.0	\$ 50° tr	31.6	56.4
	STEETVATER RIVER				Average for I	Drainage	45.3 48	0 39.8	20.3		17.4
53	Grannier Meadows	Rock Creek	470°	20mi. SW. Lander	19-3011-100T	9000 Washelie	29.6	28.4 13.7	7 10.6	10.1	5.6
	LARAMIE RIVER						- agusphur silmula a				
	Brooklyn Lake	Nash Fork	Wyo.	7mi.NW. Cntennial	11-1-11-11	10200 Medicine Bo	m 54.7 56	.5 47.6	5 24.7	21.51	19.7
11	11 Fox Park		=	Fox Park	21-13 M-78W	9200	18.0 26	1.9 19	0.8		20.00
36	36 Hairpin Turn No.2	Masi. Fork	=	5mi.NW.Cntennial	25-161-797	9500	30。0年27	.8 27.8	3 11.04		9.6
35	Libby Lodge No. 2	Libby Cr.	=	Zni. MW. Cntennial	29-1611-7877	87.00	6型91	8 11.	2 2 4	2	3.8
374		Soldier Cr.	=	10mi. SE.Laranie	35-151-724	8700	1.8	5.3 0.0	步。0	0	0 1
7	W.Port.GP.Tunnel	Laramie R.	Colo.	4mi.N. Chambers L.	7-511-7511	8600 Roosevel	414.2 25	1.13.	2 4.8	_	4.5
20		Deadman	= :	10mi.W.R.Feather	26-10M-75W	105001	50.5 59	-5 48.9	3 17.2	10	16.5
7	Deadman Hill No.2*	Deadman Cr.	=	Smi. SW. R. Feather	ATOTOTOTO	10200	43.3 48	1 38 6	70-1-0-1		75.00
	SOUTH PLATTE RIVIR				TO T 05 to 10 AU		• 1))	,
17	14 Lossier Fass	S. Flatte	Colo.	Hoodier Pass	13-88-787	11,400 Fire	31.0 38	.3 43.1	10.5	11.2	13.3
57	7 Jefrerson Creek	Cr.	=	4mi.NW.Jefferson		100501	0.4 1	1.1	E		0.0
12		S. Platte	F.	Fairplay		10000	000	0.00	0.0	0.0	0
					Average for	Urainage	10.01			o•€	†•†
	CROW CREEK										
34	34 Fole Mountain No.2 Crow Creek		4.770 ·	loni. SE. Laramie	35-151-727	S700 Median Bon		1.8# 5.3 0.0	#9.0	1.9	0.0
*	*On adjacent drainage	Φ					-				

*On adjacent drainage #Readings on original course



MISSOURI AND ARKANSAS RIVERS

Summary of Federal and State Cooperative Snow Surveys

Bureau of Agricultural Engineering, U. S. Dept. Agr.; Forest Service; Colorado Agri. Expt. Station

Leaned May 10 1939. Colo. Expt. Station Fort Colling Colo.

		Issued May	7 10,	1ssued May 10, 1939. Colo. Expt. Station, Fort Collins, Colo.	Station,	Fort Co	ollins, Colc					ı	
	Main Drainage	Local		Location		Elev.	Elev. Mational	May 1		Cours	Snow Course Measurements	sureme	int s
	and	1280	State	Locality	Descrip-			Av. S	now D	epth .	Av. Snow Depth Av. Water Content	er Cor	tent
No	No Snow Course				tion	The state of the s		Avg.	AVE. 1938 1939 AVE.	1939	Avg.	1938 1939	1939
	CHILIPPE THE PERSON NAMED IN COLUMN TO SERVICE AND ADDRESS OF THE PERSON NAMED ADDRESS OF THE PERSON NAMED AND ADDRESS OF THE PERSON NAMED							In.	In. In.	In.	In.	In.	In.
	FOUDER RIVER												
2	Big South	Poudre R.	Colo.	Colo. Pmi. E. Chambers L	33-8M-75W		Roosevelt	0.0	0.0	0.0		0.0	0.0
-	Cameron Pass	Joe Wright Cr.	=	6mi.W.Chambers L	2-6N-76W	10300	=	2-49	75.2	614.0			26.4
N	Chambers Lake	Poudre R.	= :	Chambers L.	MGZ-N-9		= :	2.51	17.5	5.3			3.1
50	Decdnan Hill	N. Poudre R.	=	LOmi.W.R.Feather	26-10M-75W			50.5	59.5	148°.0			16.5
口		N. Poudre R.	= =	2.1	6-92-74F	10200	= =	43.3 48.5 38.2 14.7	48.5	38.2			12.7
20 (Little S.Foudre		Zan San Street	10-10-01	20000	= 5	70°C	20.07	7.00			010
3	Lake Irenct	Big. S. Foudre	=	TMI.SW.MILMOF F.	Average for Drainage	TUBUU	th. Ner	76-8 12-3	1007	27 - K		16.1	12.7
	BIG THOMPSON					1							
19	67 Fell River	Foll River	= =		6-5N-74W	10600	10600 Ry. Mtn. N. P. 70.1 75.2 65.1 23.8	70.1	75.2	65-1		20.03	26.9
00	rave I rener	THOMBSON T		TUIT - OM - MITTIGE L.		for Droinse	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	200	75.0	600		26.1	25.0
	ST. VRAIN RIVER					10	000		1	· J		1	1
H	41 Wild Basin	N.St.Vrain	±	5mi.T.Allens P.	24-3N-74M	10000	ay. Mtn. N. P. 34.6 36.9	34.6		33.4 12.8		12.8	12.0
	BOULDER CREEK												
IU	5 E. Port. Moffat T. S. Boulder Gr.	S.Boulder Cr.	=	East Portal	2-25-71tm	91100	Roosevelt	0.4 1.5	1.5	0.0		7.0	0.0
99	University Camp #2	N.Boulder Cr.	***	5mi.SW.Ward	t= 0	10300 " for Drainage		28.5 27.8	54.5	23.6 10.7	-	20.4	22.3
	CLEAR CREEK												
61	61 Loveland Pass #2	Clear Creek	=	10mi.W. Georgetown 27-45-75W	27-45-76W	00101	10100 Arabaho	売・吐	55.1	47.c	1,1.3#55.1 47.0 14.1# 17.5		17.2

*On adjacent drainage

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MISSOURI AND ARK ANSAS

Bureau of Agricultural Engineering, U. S. Dept. Agr.; Forest Service; Colo. Agri. Expt. Station Summary of Federal and State Cooperative Snow Surveys

Readings on original course. *On adjacent drainage April 16 Measurement. Reservoir Storage in Acre-feet, Colorado and Tyoming, as of May 1, for the Years 1930 to 1939, inclusive A = Percentage of capacity. B = Percentage of 10-year average. Units in thousands of acre-feet. (Based on data gathered by the State Engineer of Colorado and the U. S. Bureau of Reclamation)

												10-vr.		
Reservoir	Capacity	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	Avg.	A	A
	Ac-ft Ac-ft Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	P.S.	PS
COLORADO														
Eleven Mile	81.9	1	İ	- 1	. 1	1	1	14.8	16.4	27.4	8.99	1	82	1
Cheeseman	79.0	79.1		148.0	4.8	43.4	18-7	32.0	48.7	34.4	79.1	47.1	100	168
Marston	19.8	16.6		15.1	14.6	17.1	13.8	14.2	16.7	16.7	15.4	15.6	78	66
Barr	32.2	28.4		10.2	12.0	17.8	7.7	11.4	20.0	13.3	25.6	17.6	80	145
Milton	† * †70	19.5		7.7	1.9	10.5	1.8	3.5	11.0	1,00	15.9	6.6	83	191
Riverside	57.5	50.4		41.8	12.8	146.7	12.7	44.1	147.0	30.7	54.6	39.6	95	1,38
Empire	37.7	33.5	34.4	27.1	22.2	7.45	0.0	18.6	24.7	23.0	34.4	24.3	91	17/1
Jackson Lake	35.4	34.5		33.5	33.2	33.4	31.7	31.2	33.4	33.2	34.1	33.3	96	102

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MISSCUAL AND ARKANGAS

Reservoir Storage in Acre-feet, Colorado and Wyoming, as of May 1, for the lears 1930 to 1939, inclusive (Based on data gathered by the State Engineer of Colorado and the U. S. Bureau of Reclamation) A = Percentage of capacity. B = Percentage of 10-year average. Units in thousands of acre-feet.

Reservoir	Capacity	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	10-yr.	A	A
	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	60	ુલ
COLORADO, Cont.	1		1	1	7		-		(4	,	1		i
	32.8	27.0	25.5	27.	3.	252	# 7	1200	175.00	200	28	18.1	50	158
Point of Rocks	65.0	49.5	53.0	22.2	20.00	0.09	30.1	50.8	64.3	38.0	1000	15.0	100	142
Julesburg	28.2	22.6	22.8	22.6	80.3	ි ත්	22.03	22.	80.0	22.9	21.5	22.0	10/	98
Twin Lakes	57.9	7.02	13.5	00.00	5.0	9.9	13.03	14.5	17.4	7.5	28.4	13.1	45	217
	41.9	25.3	25.00	2.51	0.0	0.0	0.0	0.0	3.0*	0.0	24.3	0%	58	300
Horse Creek	26.9	10.9	12.8	0.0	4.3	0.0	0.0	0.0	6.1	0.0	8.3	† • †	31	188
Creek	9.19	56.9	46.3	0.0	0.0	0.0	0.0	0.0	1.7	0.0	8	11.3	13	73
	17.8	1.6	14.41	4.9	0.0	2.7	0.0	5.0	1.8	3.0	8.5	4.9	748	173
	18.5	17.1	13.1	3.4	7.7	0.0	03	13.4	15.8	12.2	15.7	9.5	85	165
	10.3	5.7	3.3	1.3	7.8	3.1		1.1	0.9	6.9	6.2	3.8	9	163
	14.3	11.0	8.0	0.8	0.0	2.1	7.0	3.0	1.0	1.0	12.3	1.1	98	300
	7.5	2.0	5.3	3.0	3.1	3.3	7.0	3.0	3.0	3.9	4.8	3.5	68	157
	12.7	8.8	9.1	3.0	9.0	4.1	0.0	2.9	7.5	3.1	12.6	5.5	66	242
Windsor Res.	18.6	16.9	12.7	6.2	4.2	11.8	(V)	11.2	10.5	11.8	17.7	10.7	95	165
Cache La Poudre	9.5	9.5	00000	7.*	5.0	1.6	0%	5.7	7.3	7-57	9.5	6.9	96	132
Creek	11.6	11.6	11.6	4.3	6.1	11.2	2.9	8.1	7.1	5.5	11.7	0.00	100	146
	03.5	7.1	5.0	7.0	1.4	7. T	1,.1	2.	1.4	T. 1	5.0	14.7	72	125
	7.9	7.9	10.00	2.0	7.0	0.0	3.0	2.0	1.1	4.9	4.3	3.6	129	119
Chambers Lake	03	6.2	3.0	2.0	2.3	7.0	1.0	50	7.2	3.1	7.3	7.5	83	215
	~~													
Pathfinder	1070.0	0.906	M	352.5	7.404	331.8	133.2	263.5			430.3	413.2	750	104
	71.6	60.2	57.9	50.1	63.8	37.6	**	**L*+1	37.5**	**	45.0	47.1	**/_	89
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	185.0								0		123.5	1	19	I
Wheatland	90.0				a Grande Grand			35.0*	80.9		51.0	1	57	1
	1,56.6						354.8	387.7	342.1		394.3	•	86	1
Jackson Lake	0.748	572.7	450.4	185.7	535.9	348.6		331.5	504.2	430.6	1	I I	!	ì
Bull Lake	152.0						1			0	45.8	1	000	1
Pilot Butte Lake	30.0				_					21.5	19.8	1	99	1
** ** ********************************	**************************************	**	E)1 610	Acres Trees	+							. —	2374-	(65
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^{**}Based on capacity 54,610 Acre-Feet. *Estimated